

694.2

694.3

THE

# Goetz-Mitchell Method of Anchoring Buildings

ILLUSTRATED.

The floor joists generally have with the outer wall some fixed connection which, in falling, forces the wall to buckle and fall out or in. It should be insisted by Underwriters that a method of anchoring should be adopted, so that falling of joist shall free this anchorage and leave the wall standing.

—*Scientific American, Builders' Edition, 1887.*

The most frequent cause of depreciation of buildings arises from dry rot of timbers, which can generally be avoided by allowing the air to have free contact with the timber. Beams are frequently sealed so tightly where they enter the wall that dry rot takes place within the walls while the exposed portion of the beam within the room is entirely sound.

—*American Architect and Building News.*

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The Goetz-Mitchell Method obviates the above named serious defects.  
The falling of joists *frees* the anchorage and leaves the walls standing.  
By a system of ventilation it *prevents* the rotting of the ends of joists.  
A greater weight upon our beam increases the *strength* of our Anchor.  
No fire from a defective flue can *ignite* a joist end encased in our Protector.



HENRY A. GOETZ.

## THE GOETZ-MITCHELL PATENTED METHOD

— OF —

### Anchoring Buildings and Preventing Dry Rot in the Beams.

This method is the best ever patented. It is perfect, and has met with the unqualified approval of every Architect, Building Inspector and Insurance Expert. It has been tested by the United States Government testing machine and was found to be stronger than any method now in use.

HENRY A. GOETZ,

MANCELL W. MITCHELL,

} Patentees.

HOME OFFICE:

No. 77 STATE STREET, NEW ALBANY, IND.



MANCELL W. MITCHELL.

## DRY ROT

IS a kind of decay, often very rapid, to which timber is subject without the presence of much moisture. If the end of a joist or beam is confined in a wall, the albumen of the wood begins to sour or ferment. This fermentation produces fungi, the mycelium of which diffuses itself through the substance of the timber, destroying its texture and reducing it to a fragile or even a friable mass. Damp walls and moisture will greatly hasten the process of decay.

It has proved ruinous to many valuable edifices and has been the cause of many serious accidents. The ends of joists are the most liable to be affected by it, so that upon being burdened with even a slight additional load they are ready to break off by the wall; and the process of destruction has often gone far without a suspicion being entertained of anything wrong.

By the Goetz-Mitchell method of construction (see pages 5, 7, 9 and 11) we provide a cast-iron ventilated box, securely

built into the wall, into which each joist end rests. This permits a circulation of air around the end of joist and prevents fermentation and accumulation of fungi. If timber is wet or unseasoned it will have a chance to dry out after it is put into a building.

### Faulty Construction of Buildings.

The serious destruction of property by fire and the fearful losses of life demonstrate the importance of *any improvement* by which greater security in the construction of buildings can be obtained without too much cost.

The walls of a building should not only serve as an inclosure and support, but as far as possible should, by remaining erect during a conflagration, serve as an impenetrable barrier to prevent the extension of fire. Could the walls have retained their vertical position during the great fires of Chicago and Boston, it is evident that the progress of the fire in certain directions would have been stayed and the damage have been much less.

The joist usually has with the outer wall some *fixed connection*, this is generally well fastened to joist and securely built in the wall. In case of fire the joist quickly burns through and in falling, the *fixed connection* causes the wall to buckle and fall out or in.

In many cases the joists overlap or butt when built into a party wall. Careless builders sometimes permit the joist to enter smoke flues. The Goetz-Mitchell Anchor or Beam End Protector will obviate the defects heretofore mentioned. The method illustrated on pages 5, 7, 9, 11, consists of building into the wall a protector or socket of dove-tail shape larger at the back than the front; this makes it impossible to pull it out of the wall, for the following reason: a smooth brick is held in a wall by adhesion, friction and weight, the Goetz-Mitchell Anchor and Beam End Protector is held by at least ten bricks all of which must be pushed aside or pulled in one lump, before our box will leave the wall. No other method of anchoring presents as much strength.

At the bottom of the Protector there is an upwardly projecting lug; this, in combination with a notch in the beam (three to four inches from the end) that fits over the lug, forms a tie between the opposite walls. It is self-evident that the more

weight there is upon the beam the greater will be the bondage that holds beam to box and box to wall.

In case of fire or accident, the joist can burn through or break, and in falling they *free* the Anchorage and leave the wall standing, not even weakened by the space left in the wall, because the Protector remains and the crushing strain of this cast-iron box is much greater than that of the wall. No break or breach is made in the wall, and the Protector that remains, securely held, forms a space for the easy replacement of joist. The Protector provides a perfect and secure foundation for each joist. Fire from a defective flue can not ignite a joist end, because it is protected by a ventilated cast-iron box.

This method of holding joist can be advantageously employed in frame houses where it is necessary to place joist on a level with outside pavement, by doing away with the sill and building the joist direct into foundation, each joist to be protected from rotting by the use of the Goetz-Mitchell Anchor and Beam End Protector.

Philadelphia Fire Underwriters' Association.

136 and 138 South Fourth Street.

PHILADELPHIA, PA.

The Wall Anchor and Protector to receive a floor girder or joist in a brick wall which you submitted to me, I consider a great advantage to a structure, both for rigid construction and the apparent preservation of the wall end of the girder from decomposition. As a precaution in the interest of the prevention of fire it also has features that should attract the attention of those that are interested in the reduction of the fire waste in this country. I am glad to see that you are working in the direction of better construction, and trust you will receive such support and indorsement as your device merits. Its use would be an advantage to fire insurance interests.

Very truly yours,

FRANCIS W. WHITING,  
*Superintendent.*

Department for the Inspection of Buildings.

Old State House.

CITY OF BOSTON.

I have examined the Goetz-Mitchell Anchor and Floor Timber Protector and find that the principle is unique, simple and effective, and worthy the attention of architects and master-builders who, in construction, desire to accomplish the best practical results.

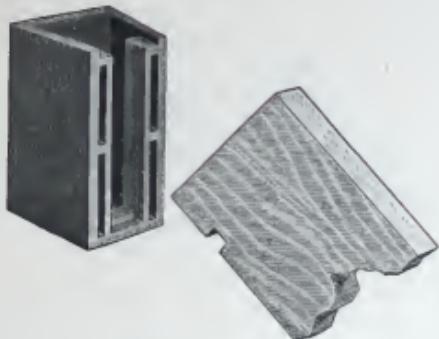
It gives to the walls, by this system of anchoring, a rigidity not accomplished by the methods now practiced.

The safety of walls in case of fire is assured to the extent that they are not liable to the force of the falling joist, as they would be by other methods. The durability as against dry rot is secured by a system of ventilation.

JOHN S. DAMRELL,  
*Inspector of Buildings.*

## The Goetz-Mitchell Anchor and Beam End Protector.

No. 1.



No. 1 is used mostly for ground floor joist, in brick or frame houses. It gives plenty ventilation and permits no dampness from wall to reach the joist.

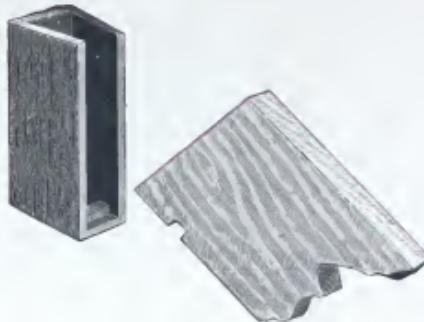
In structures where ceiling and floor are fire proofed, our method will allow a circulation of air from end to end of a building, by leaving a small opening in ceiling or wall at each end. This will effectually prevent any dry rot which is so prevalent in fire proofed buildings.

In case of bad plumbing the vitiated air under floor can be driven out and will not accumulate.

Average weight of box for 2x12 joist is 15 to 17 lbs. The back and sides are  $\frac{3}{8}$  inch, the bottom  $\frac{1}{2}$  inch thick. The (U. S. test) crushing strain is 82,100 pounds.

## The Goetz-Mitchell Anchor and Beam End Protector.

No. 2.



No. 2 represents our Anchor somewhat simplified by eliminating the side guides. This box we recommend for all upper floors where no great dampness is likely to exist and where the air space formed by the dove-tailed sides is enough ventilation. The lug and notched beam are same as No. 1. The cost is also somewhat less. Mice and vermin usually work their way through a wall wherever the joist ends meet. It is impossible for them to do this with Goetz-Mitchell method.

Fire from a defective flue can not reach a joist end, because each joist is covered by a cast iron ventilated socket or Protector.

Average weight of No. 2 for 2x12 joist is 12 to 15 pounds.

## Architect's Office U. S. Capitol.

WASHINGTON, D. C.

I have examined your improved Anchor and Beam End Protector to be used in walls for the support of joist and iron beams and consider the device an admirable one for the purpose you name.

Very truly yours,

EDWARD CLARK,  
*Architect U. S. Capitol.*

## Department of Public Safety.

PITTSBURGH, PA.

I consider this a valuable improvement over the present methods of anchoring joist and beams to walls, and would like to see it adopted by architects and builders of this city. It certainly has my full endorsement.

M. G. FRANK,  
*Inspector of Buildings.*

## The American Fire Insurance Co.,

308 and 310 Walnut Street.

PHILADELPHIA.

Your patent Beam Protector and Anchor commends itself to us as a sure means of preserving the beams, also of preventing the spread of fire, and on this latter account its introduction into general use will be welcomed by all underwriters.

Yours very truly,

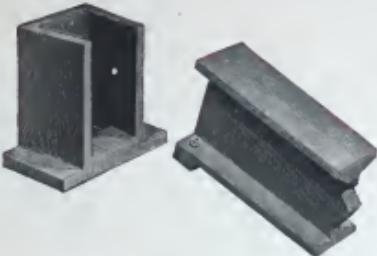
THOS. H. MONTGOMERY,  
*President.*

## National Association of Fire Engineers.

I heartily endorse the Goetz-Mitchell Anchor and Beam End Protector as being one of the most valuable inventions yet patented.

HENRY A. HILLS,  
*Secretary.*

### The Goetz-Mitchell Anchor and Beam End Protector.

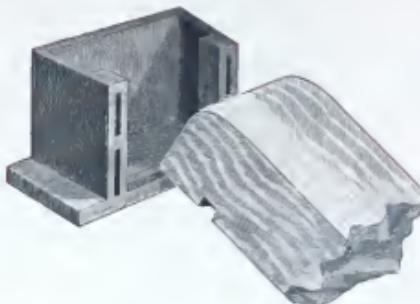


No. 3.

No. 3 is our method of anchoring walls in iron construction. A lug bolted on the bottom of iron beam interlocks with the lug on the bottom of the box, forming a tie that increases in strength as the weight on beam increases. With the great mass of tiling and brick that is loaded on a beam it often happens that the same gives way and in falling pulls down enough of the wall to which it is anchored to destroy the whole building. An iron beam that becomes heated will not bear its own weight.

The National Board of Underwriters reported a case in St. Louis where such a building was a mass of ruins twenty minutes after the fire was discovered. With the Goetz-Mitchell method of anchoring, such a calamity would be impossible, for any one beam could fall out, leaving the balance of the structure to resist the fire. The bed-plate is now generally used, and the cost of our Anchor would be the extra material from the bed-plate up, say 9 to 15 pounds. The cost of this would about equal that of the wrought-iron ties now in use.

### The Goetz-Mitchell Anchor and Beam End Protector.



No. 4.

No. 4 is our method for mill construction. The bottom of box is extended outwardly, forming a solid bed-plate for beam, the side guides give ventilation and serve to hold beam in position, while the exterior dove-tail sides securely hold the box in the wall. A notch in the beam fits over an upwardly extending lug in the bottom of box and forms a secure tie or anchor, which is stronger than any known method. A falling beam does not weaken the wall because the Protector remains. No dampness from wall can affect the beam; dry rot is prevented; no fire can pass through in either direction; it compels the builder to do his work right; no two beams can ever meet, nor can they be built so far in as to break the wall in falling out.

The actual cost of our Anchor is the extra material, from bed-plate up, which will about equal the wrought-iron ties now used.

Glens Falls Insurance Co.,

208 and 210 La Salle Street.

CHICAGO, ILL.

It gives me much pleasure to recommend your Anchor and Beam End Protector. It is the best device that has ever come to my attention for the strengthening of a building and protecting the joists from decay. In event of fire the device will be of great advantage, in that the joists may drop out without doing injury to the walls, or without danger of communicating fire to adjoining buildings. I trust the day may not be far distant when the device will be adopted by builders generally.

Very truly yours,

J. L. WHITLOCK,  
*Manager Western Dept.*

Office Chief Fire Department.

NEW ALBANY, IND

The Anchor and Protector invented by Goetz and Mitchell, if generally adopted, will greatly cut down fires from defective flues. Their method of freeing the anchorage in case of beams falling is also a good idea.

Every fire chief can give instances where falling walls have killed firemen. This would not be likely to happen if beams were fastened to wall by this method.

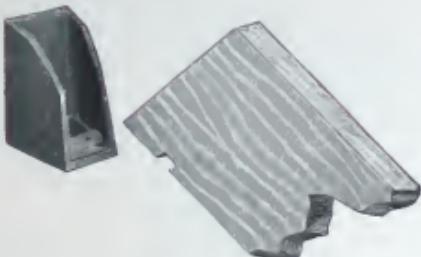
Large fires are usually made more disastrous on account of falling timbers pulling the wall down and thereby permitting the fire to attack adjoining property.

CHARLES T. MATTHEWS,  
*Chief.*

## Goetz-Mitchell Anchor and Beam End Protector.

### The Goetz-Mitchell Anchor.

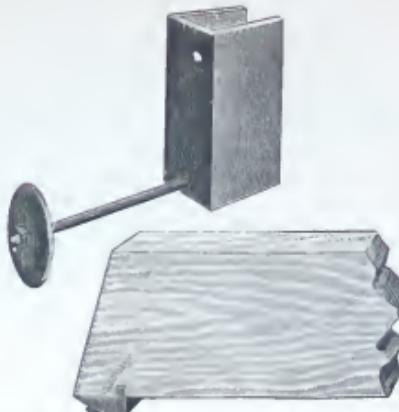
No. 5.



No. 5 represents our patent as an Anchor only. This socket can be used with any height of joist, the different sizes depending upon their width.

In competition with present style it can be used on every sixth or eighth joist, and in this way holds more than the present law requires, but our claim is, that the present practice is very defective and not safe enough. We therefore prefer that our Anchors be used on every joist.

Average Weight 10 to 12 pounds.



In special cases it is sometimes necessary to provide very strong anchorage. By experiments we have found that an iron washer notched into beam and screwed on (as shown above) will present the greatest possible strength.

A bolt passed through the back of box near bottom, with a large washer and nut upon outside of wall, will give the best construction for the anchor. The above plan is also covered by our patents.

On a 2-inch joist with above method the shearing tension is about 5,600 pounds.

*A. B. Mullett, Architect,*

*1411 F. Street, N. W.*

*WASHINGTON, D. C.*

I have examined your Anchor and Beam End Protector and consider it a meritorious and valuable invention.

Very respectfully,

*A. B. MULLETT.*

*Board of Building Inspectors,*

*Office City Hall.*

*PHILADELPHIA, PA.*

We pronounce this method of anchoring a fine improvement upon the methods now in use. The invention deserves every encouragement, and can not be recommended too highly.

*JAMES ZIMMERMAN,  
JOSEPH M. HANCOCK,  
Inspectors.*

*James G. Hill, Architect,*

*Corcoran Building.*

*WASHINGTON, D. C.*

I am very favorably impressed with your Anchor and Beam End Protector. I have no doubt that the stability of structures, as well as durability, will be increased by its use.

Yours truly,

*JAS. G. HILL.*

*Underwriters' Association,*

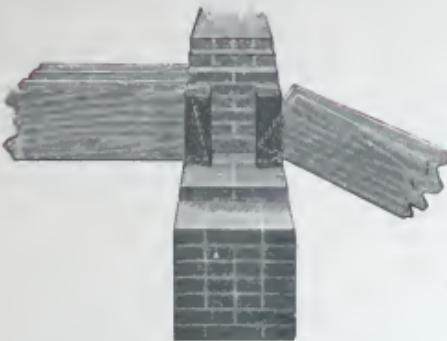
*Third and Walnut.*

*CINCINNATI, O.*

I consider the Goetz-Mitchell method of anchoring a good thing.

*CHAS. E. MARSHALL,  
Secretary and Surveyor.*

### The Goetz-Mitchell Method of Anchoring.



Applied to a Tenement, Partition or Party Wall.

In case of fire or accident upon either side the joists can fall out, while every joist upon the other side is holding the wall in position.

No fire can pass through the wall to ignite the joist ends that rest upon the same party wall.

No neglect or carelessness of builder can make the joist ends meet in the wall.

No joist end is exposed to fire from being built in close proximity to smoke or heat flues.

### The Goetz-Mitchell Anchor and Beam End Protector.



This cut shows our Anchor built into the wall ; one joist has been drawn out to show method of bondage.

Our method is superior to ledges or corbelled walls for the following reasons :

Ledges disfigure the interior walls. Ledges throw weight out instead of down. It is much safer for joist to rest upon the wall than upon a ledge. Some times the upper row of bricks on a ledge let down, thereby causing the joist to act as a pry to force the sustaining walls apart.

Millers' National Insurance Co.,

205 La Salle Street.

CHICAGO, ILL.

I have examined your Anchor and Beam End Protector, and in my opinion its use would add greatly to the security of buildings, both against fire and decay of joist, and would also be useful for the anchor on the ends of joist to hold walls at their proper distances.

Respectfully yours,

W. L. BARNUM,  
*Secretary.*

Fremier's Insurance Company,

La Salle Street.

CHICAGO, ILL.

I have seen and examined your device for anchoring and bearing joists and do not hesitate to say that during my experience of twenty years as an underwriter in this city I have seen nothing which can compare with it for the protection of walls in case of fire and the prevention of the rotting of joist at the point where they enter the wall.

Yours, etc.,

JOHN L. SKELTON,  
*Secretary.*

Ordnance Department U. S. A.

—♦ REPORT OF MECHANICAL TESTS ♦—

MADE WITH THE U. S. TESTING MACHINE

—AT—

Watertown Arsenal, Mass., October 24, 1888,

—FOR—

HENRY A. GOETZ, OF NEW ALBANY, IND.

TESTS BY TENSION—Anchors for Joists of Buildings.

TESTS BY COMPRESSION—Cast-iron Ventilated Box for Joist Ends.

CORRECT:

J. E. HOWARD.

IRA MAC NUTT.

*Capt. Ordnance Dept U. S. A., Commanding.*

Edbrooke & Burnham  
Architects

184 Dearborn Street,

CHICAGO, ILL.

We have examined your Anchor and Beam End Protector and do not hesitate in saying that we believe it to be the best device yet introduced for the purpose of security against fire or decay, and to serve as anchorage for the joist.

Respectfully yours,

EDBROOKE & BURNHAM.

I fully concur with the above, and would recommend it to all builders.

T. A. BOWDEN,  
*Supt of Survey,*  
THE CHICAGO FIRE UNDERWRITERS' Ass'n

A. B. Bacon,  
Architect

Chamber Commerce,

TOLEDO, O.

I have examined your Anchor and Beam End Protector and regard it as an admirable device, not only for its prime object in preventing "dry rot" in the wood, but for the prevention of the falling of walls in case of fire, and the absolute protection of joists from fire in being built in close proximity to smoke flues.

Its introduction into use deserves assurance.

Yours truly,

N. B. BACON

A. S. Test No. 5249.



Spruce Joist 3x12 inches.

Wrought iron anchor  $\frac{1}{2} \times 1\frac{1}{2}$ , fastened on with two wrought  $\frac{1}{4}$ -in. nails  
3 inches long.

APPLIED LOADS.

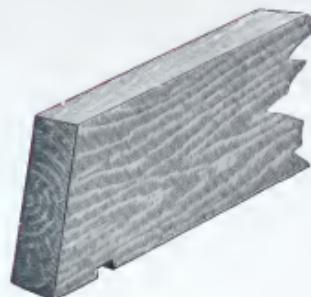
700 pounds,	STRAP MOVEMENT.
1,080 "	$\frac{1}{8}$ inch.
1,450 "	$\frac{1}{4}$ "
1,250 "	$\frac{1}{2}$ "

Maximum resistance, 1,450 pounds.

The above anchor was put on according to New York and Washington Building Laws (which specify the anchor to be nailed on the side of beam, with at least two wrought-iron nails  $\frac{1}{4}$  inch thick; no length given).

The joist was securely held and the load applied at **L**, on a line with the iron strap, for the purpose of determining the number of pounds tension required to pull the iron strap from the joist.

A. S. Test No. 5248.



Spruce Joist 3x12 inches.

Shearing area  $3.55 \times 2.90 = 10.30$  square inches.

Shearing strength, 3,058 pounds—297 pounds per square inch.

A  $\frac{1}{2}$ -inch notch was cut  $3\frac{1}{2}$  inches from end as required for the Goetz-Mitchell method. It was then hooked over a lug and the load applied on a line with the joist, the notched end pulled off or sheared off with the above result.

The strength of the Goetz-Mitchell Anchor depends upon the tension necessary to pull off the notched end. In 5248 and 5254 tests there was no weight put on beam. In actual use the weight on beam would increase the shearing strength of notched end on account of friction and compression. Therefore, in practical use our Anchor would stand a higher tension than the U. S. test gives us.

## Toledo Fire Underwriters' Association.

Produce Exchange Building.

TOLEDO, O.

I have examined your Anchor and Beam End Protector and regard it as an admirable device for preventing dry rot and also preventing the falling of walls in case of fire. It protects the ends of joist from fire in being built in close proximity to smoke flues, and positively prevents the joists from overlapping when built in party walls.

Yours, very respectfully,  
CHAS. M. LANG,  
*Secretary and Surveyor.*

## German National Insurance Co..

First and Market Streets.

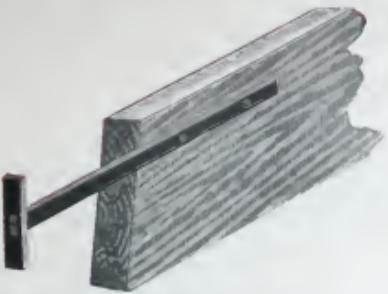
LOUISVILLE, KY.

It affords a great deal of pleasure to me to say to you that I have inspected your Anchor and Beam End Protector and consider it a first-class invention.

It will do away with the rotting of the ends of joist, and in case of fire will prevent to a great extent the falling of walls. Wishing you success,

I remain, yours respectfully,  
ADOLPH REUTLINGER,  
*President.*

## A. S. Test No. 5250.



Spruce Joist 2x12 inches.

Wrought-iron anchor  $1\frac{1}{2} \times \frac{1}{2}$ , fastened on with two wrought  $\frac{1}{4}$ -inch nails  
two inches long.

APPLIED LOADS.

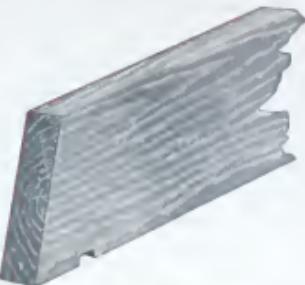
860 pounds.  
970 "  
1,060 "

Maximum resistance, 1,060 pounds.

STRAP MOVEMENT.

$\frac{1}{10}$  inch.  
 $\frac{1}{8}$  "  
 $\frac{1}{2}$  "

## A. S. Test No. 5254.



Spruce Joist 2x12 inches.

Shearing area  $3.55 \times 2 = 7.10$  square inches.

Shearing strength, 2,560 pounds—361 pounds per square inch.

A notch  $\frac{1}{2}$ -inch deep was cut  $3\frac{1}{2}$  inches from end as required for Goetz-Mitchell method. The load was applied same as 5248 and at a tension of 2,560 pounds the notched end pulled off.

## A. S. Test No. 5253.

Same as above, except three nails were used instead of two.

Maximum resistance, 1,370 pounds.

A great weight upon the joist makes them sag in the middle and tends to force the sustaining walls apart. In Goetz-Mitchell method the bondage is such that the walls are pulled inward. Think it over and see if this is not an important advantage.

In our method every joist forms an anchor, making the two opposite walls practically one, and at the same time so tied as not to pull each other down in case of fire or accident.

A beam securely fastened at both ends to the sustaining walls will carry a much greater load than one merely resting upon the walls.

McDonald Bros.,  
Architects,

Bull Block.

LOUISVILLE, KY.

We have examined your method of anchoring and protecting beams and in our opinion its use would unquestionably add greatly to the security of buildings, both against fire and the decay of joist, and that it would also be a useful anchor on the ends of joist to hold walls at their proper distance.

Respectfully yours,  
MCDONALD BROS.

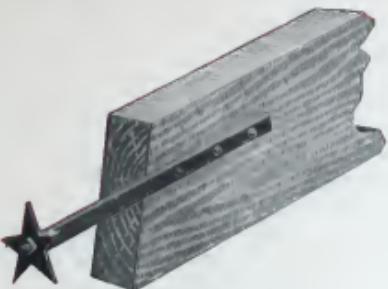
Office of the Commissioners,  
District of Columbia.

WASHINGTON, D. C.

I have examined your Anchor and Beam End Protector and regard it as an admirable invention. It will prevent the falling of walls during a fire. It is an absolute protection of the joist against fire from defective flues. Its introduction into use deserves every assistance.

Very respectfully,  
THOS. B. ENTWISLE,  
*Inspector of Buildings, D. C.*

A. S. Test No. 5252.



Spruce Joist 3x12 inches.

Wrought-iron Anchor  $\frac{3}{8} \times 1\frac{1}{2}$ , fastened on with three wrought  $\frac{1}{4}$ -inch nails 3 inches long.

APPLIED LOADS.

1,590 pounds.  
2,380 "  
2,780 "

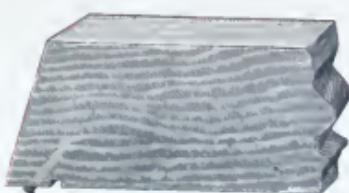
STRAP MOVEMENT.

$\frac{1}{16}$  inch.  
 $\frac{3}{4}$  "  
 $\frac{1}{2}$  "

Maximum resistance, 2,780 pounds.

In these tests the fact was developed that after the strap had moved over one-half inch the maximum resistance had been passed. This leads to the conclusion that if a wall is anchored by straps and nails and settles outwardly over one-half inch then the anchor has lost its maximum strength and does not hold the wall so secure as generally supposed.

A. S. Test No. 5251.



Spruce Joist 3x12 inches.

A lag screw 4 inches long was driven into the wood at an angle of about  $45^\circ$ , in front of notch in joist as shown, the shearing area being  $3.512 \times 90 = 315$  square inches.

At 3,780 pounds tension = 372 pounds per square inch on shearing section, the section of wood exposed to shear fractured.

The tension was then increased to 4,300 pounds, when the lag screw pulled out.

Foundations sometimes settle out or in when the joists are rotted off. Such an accident is an impossibility when foundation walls are anchored and held together by the Goetz Mitchell method of construction.

The strength of a sustaining or division wall depends upon its weakest part: the weakest part is that into which the joist are built.

Traders Insurance Co.,

160 La Salle Street.

CHICAGO.

I have examined your Anchor and Beam End Protector and feel warranted, as well as gratified, in saying that I think it an admirable contrivance, which will at once commend itself to any one who has had any experience with falling walls or decayed joist. I hope and trust that it may come into general use all over the country.

Very truly yours,

R. J. SMITH,  
*Secretary.*

Riggs Fire Insurance Co.,

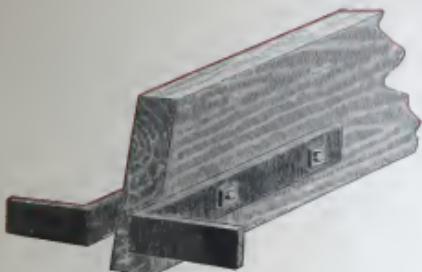
1331 F. Street N. W.

WASHINGTON, D. C.

I have examined your method for protecting ends of joist and anchoring same to walls and regard the same as a very satisfactory device for protecting buildings from a very common cause of fires, "defective flues," and also in preventing the falling of walls during fires.

Very respectfully,

FRANCIS B. MOHUN,  
*Secretary.*



$\frac{1}{2} \times 3$  in. x 1 ft. 4 in. long, with wings 8 inches.  $\frac{1}{2}$  in.-bolts.

The above anchor will hold to the joist better than to the wall. The wings reach in behind second course of brick, presenting, therefore, a resistance probably of 8 bricks.

The Goetz-Mitchell Anchor is held in by at least 10 bricks (5 on each side), to the height of the entire joist.



Strap  $\frac{1}{2} \times 2$  in., 2 ft. long;  $\frac{1}{2}$  in. bolts; cross piece  $\frac{1}{4} \times 1$  ft. 8 in.

These various Anchors are in use in the better class of buildings. The U. S. Government, especially, has used them. In each of these methods the specification requires the joist cut on a splay, so that in case of fire the joist can fall out without damage to the wall, and at the same time the Anchor is so securely fastened and bolted on, that the joist *can not* fall out.

## References—Builders.

JOHN S. STEVENS, President <i>National Master Builders</i> . . . . .	PHILADELPHIA.
WM. H. SAYWARD, Secretary <i>National Master Builders</i> . . . . .	BOSTON.
JAMES JOHN, <i>Secretary Builders' Exchange</i> . . . . .	CHICAGO.
W. J. FRYER, <i>Editor New York Building Laws</i> . . . . .	NEW YORK.
JOHN MOORE, <i>Builder</i> . . . . .	SYRACUSE.
CHAS. EDMONDSON, <i>Builder</i> . . . . .	WASHINGTON.
J. STUT. NEAL, <i>Superintendent Construction U. S. Custom House</i> . . . . .	NEW ALBANY.
HANSELL, ELCOCK & CO., <i>Architectural Foundry</i> . . . . .	CHICAGO.
G. W. & F. SMITH, <i>Architectural Foundry</i> . . . . .	BOSTON.
WM. CLENDINNENG & SON, <i>Architectural Foundry</i> . . . . .	MONTREAL.
SHOVER & CHRISTIAN, <i>Builders and Contractors</i> . . . . .	INDIANAPOLIS.
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WM. FERGUSON, <i>Builder and Contractor</i> . . . . .	BALTIMORE.
A. McALLISTER, <i>Builder and Contractor</i> . . . . .	CLEVELAND, O.
H. S. CHRISTY, <i>Builder and Contractor</i> . . . . .	WILMINGTON.
CHAS. PIERCE, <i>Builder and Contractor</i> . . . . .	INDIANAPOLIS.
ASA CATON, <i>Builder and Contractor</i> . . . . .	BOSTON.

## References—Fire.

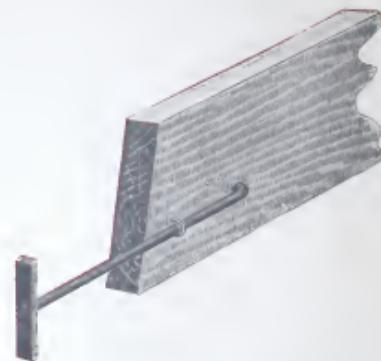
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D. A. HEALD, <i>President "Home"</i> . . . . .	NEW YORK.
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D. P. TRESENRIDER, <i>Chief Fire Department</i> . . . . .	COLUMBUS, O.
SAM N. EVANS, " " "	PITTSBURGH.
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Every 5th Joist, Iron Strap  $\frac{1}{4} \times 2$  in.; forked end turned up.

This method is used in many cities. In our opinion it is probably the worst one to pull a wall down. It is fastened on top and forms an immense leverage between the splayed end and fork of anchor, that will pull down any wall in which it may be built.

The Goetz-Mitchell method is directly opposite to above plan.



$\frac{7}{8}$  round iron; hook on end fitting in hole bored near bottom of joist.  
A staple driven over anchor to hold it in place.

This method was tested and stood a tension of 3,060 pounds, when the hooked end in wood gave way. The anchor being fastened near bottom gives it a chance to fall, but the anchorage is not free like in Goetz-Mitchell method.

The strength depends entirely upon the hooked end.

## References—Architects.

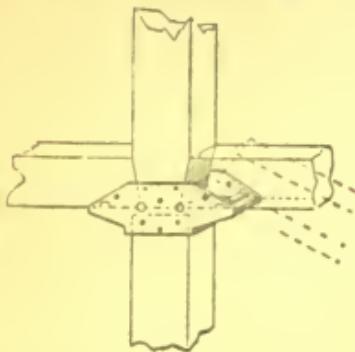
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## References—Inspectors.

W. J. EDBROOKE, <i>Commissioner of Buildings</i>	CHICAGO.
D. J. SWENIE, <i>Fire Marshal</i>	CHICAGO.
R. T. SCOWDEN, <i>City Engineer</i>	LOUISVILLE.
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# The Goetz-Mitchell Timber Cap and Seat.

PATENTED SEPTEMBER 30, 1890.



Costs no more than other methods.

No crushing of horizontal timbers; no splintering of the ends of columns.

Prevents in a measure the vibration of the building, because base of column is firmly held and braced.

Large air holes prevent the accumulation of dampness and consequent dry rot.

Is indorsed by Underwriters.

During fire the horizontal timbers can fall without damage to the vertical posts.

All parts are securely bolted and notched together.

The *Cap* and *Seat* being bolted to upper column will carry the parts if sustaining post should be thrown down or burnt out during a fire.

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